

a single deflector which deflects the plurality of laser beams during the scanning operation;
an imaging optical system that converges the plurality of laser beams deflected by said single deflector on the surface to be scanned; and
a beam detector that receives the plurality of laser beams directed to outside of the predetermined imaging area via at least one lens element included in said imaging optical system, a synchronizing signal being generated upon detection of each of the plurality of light beams by said beam detector,
an optical characteristic of said imaging optical system being configured such that the laser beams directed to said predetermined imaging area are aligned in a scanning direction, while the laser beams directed to said beam detector are shifted in the scanning direction. - - -

REMARKS

Initially, Applicant would like to express his appreciation to the Examiner for the detailed Official Action provided, for the indication that the drawings as filed are acceptable, for the acknowledgment of Applicant's Claim for Priority and receipt of the certified copy of the priority document in the Official Action, and for the acknowledgment of consideration of Applicant's Information Disclosure Statement by return of the Form PTO-1449.

Upon entry of the above amendments, the specification will have been amended, claims 1, 2 and 5-8 will have been amended, and claim 9 will have been submitted for consideration. Claims 1-9 are currently pending. Applicant respectfully requests reconsideration of the outstanding objections and rejections, and allowance of all the claims pending in the present application.

In regard to the objection to the specification set forth on page 2 of the Official Action, the above amendment to the specification incorporate the Examiner's suggested change. Accordingly, Applicant respectfully requests that the objection to the specification be withdrawn.

In regard to the objection to claims 5 and 6 set forth on page 2 of the Official Action, the above amendments to the claims incorporate the Examiner's suggested changes. Accordingly, Applicant respectfully requests that the objection to claims 5 and 6 be withdrawn.

On pages 2-5 of the Official Action, claims 1-3, 7 and 8 were rejected under 35 U.S.C. § 102(b) as being anticipated by ISHIKAWA (U.S. Patent No. 5,124,829).

Applicant respectfully traverses the rejection of claims 1-3, 7 and 8 under 35 U.S.C. § 102(b).

Claims 1 and 7, as presently amended, each include, inter alia, ". . . a plurality of light sources that emit a plurality of laser beams having different wavelengths,

respectively; a single deflector which deflects the plurality of laser beams simultaneously
...."

Applicant submits that ISHIKAWA lacks any disclosure of a deflector which
simultaneously deflects a plurality of laser beams having different wavelengths.

Applicant notes that the different wavelength laser beams of ISHIKAWA are not
disclosed as scanning *simultaneously*, and thus are clearly not disclosed as being
deflected *simultaneously*. Particularly, since beam 12a is for reading and beam 14a is for
recording, it is clear that they are not used at the same time. Rather, only one of beams
12a or 14a is used, dependent upon the position of mirror 48. Note Fig. 1 and column 5,
lines 50-65. Applicant notes that there is no disclosure in ISHIKAWA that reading and
recording can be performed simultaneously. Note, for example, column 6, lines 35-57.
The teachings of ISHIKAWA are instead directed to focal point adjustment means 26a-
26d (as shown in Figs. 3a-3d) which are adjusted for separate, distinct operations with the
different wavelength beams.

Claims 1, as presently amended, also includes, inter alia, ". . . an optical
characteristic of said imaging optical system being configured such that the laser beams
directed to said predetermined imaging area are aligned in a scanning direction, while the
laser beams directed to said beam detector are shifted in the scanning direction."

Applicant submits that ISHIKAWA lacks any disclosure of the recited optical characteristic. Since the different wavelength laser beams of ISHIKAWA do not scan *simultaneously*, as discussed above, they are clearly not *aligned in the scanning direction* in the imaging area, or *shifted in the scanning direction* when directed to the beam detector.

Claims 7, as presently amended, also includes, inter alia, ". . . said imaging optical system having a first range and a second range along a scanning direction, the laser beams directed to said imaging area passing through said first range, the laser beams directed to said beam detector passing through said second range, said imaging optical system being configured such that, within said first range, a lateral chromatic aberration of said imaging optical system is compensated for, and such that within said second range, a lateral chromatic aberration remains so that the plurality of laser beams are separated from each other in the scanning direction."

Applicant submits that ISHIKAWA lacks any disclosure of the recited configuration of the imaging optical system. Since the different wavelength laser beams of ISHIKAWA do not scan *simultaneously*, as discussed above, they are clearly not *separated from each other in the scanning direction* within a second range in which they are directed to the beam detector. Further, there is no disclosure in ISHIKAWA that a

lateral chromatic aberration of the imaging optical system is compensated for in a first range, while remaining in a second range.

Applicant also submits that dependent claims 2, 3 and 8, which are at least patentable due to their dependency from claims 1 and 7, for the reasons noted above, recite additional features of the invention and are also separately patentable over the prior art of record. For example, since the plurality of beams are not scanned simultaneously, it is clear that one of the reflecting surfaces of polygon mirror 20 of ISHIKAWA does not reflect the plurality of laser beams during each scan, as recited in claim 2. Further, with regard to claim 8, there is no disclosure in ISHIKAWA of a plurality of beam spots being aligned in the scanning direction within an imaging area, or a plurality of laser beams passing through a second range being incident on the beam detector at different timings.

Applicant respectfully submits that the rejection of claims 1-3, 7 and 8 under 35 U.S.C. § 102(b) is improper for each and certainly for all of the above-noted reasons. Accordingly, Applicant respectfully requests reconsideration and withdrawal of the rejection, and an early indication of the allowance of these claims.

On pages 5 and 6 of the Official Action, claims 4-6 were rejected under 35 U.S.C. § 103(a) as being unpatentable over ISHIKAWA (U.S. Patent No. 5,124,829) in view of KONDO (U.S. Patent No. 5,739,940).

Applicant respectfully traverses the rejection of claims 4-6 under 35 U.S.C. § 103(a).

Initially, Applicant notes that the teachings of KONDO fail to cure the deficiencies in the disclosure of ISHIKAWA noted above with regard to claim 1. Accordingly, Applicant submits that claims 4-6 are at least patentable due to their dependency from claim 1 for the reasons noted above. Further, claims 4-6 recite additional features of the invention and are also separately patentable over the prior art of record. For example, Applicant notes that KONDO, at the most, teaches providing a diffraction grating prior to a deflector, rather than in an imaging optical system that converges a plurality of beams after deflection by a deflector. In other words, KONDO does not teach providing a diffraction grating on a scanning lens. Further, Applicant submits that there would have been no reason for one of ordinary skill in the art to provide such a diffraction grating in the system of ISHIKAWA, and particularly not to provide a diffraction grating on a lens of an imaging optical system to achieve an optical characteristic as recited in claim 1. In regard to claim 5, Applicant submits that KONDO also lacks any teaching of passing a laser beam through an area outside of a predetermined area which includes such a diffraction grating.

Accordingly, Applicant submits that the rejection of claims 4-6 under 35 U.S.C. § 103(a) is improper for each and certainly for all of the above reasons. Applicant

respectfully requests reconsideration and withdrawal of the rejection, and an early indication of the allowance of these claims.

Applicant submits that newly presented claim 9 is also patentable over the prior art of record. In this regard, Applicant notes that ISHIKAWA does not disclose a plurality of light sources that emit a plurality of laser beams having different wavelengths *during a scanning operation*, or a single deflector which deflects the plurality of laser beams *during the scanning operation*. Rather, as noted above, the plural beams of ISHIKAWA are each alternatively used in distinct operations (i.e., reading or recording) and not together in a scanning operation. Accordingly, Applicant respectfully requests an early indication of the allowance of this claim.

SUMMARY AND CONCLUSION

Entry and consideration of the present amendment, reconsideration of the outstanding Official Action, and allowance of the present application and all of the claims therein are respectfully requested and now believed to be appropriate.

Applicant has made a sincere effort to place the present application in condition for allowance and believes that he has now done so.

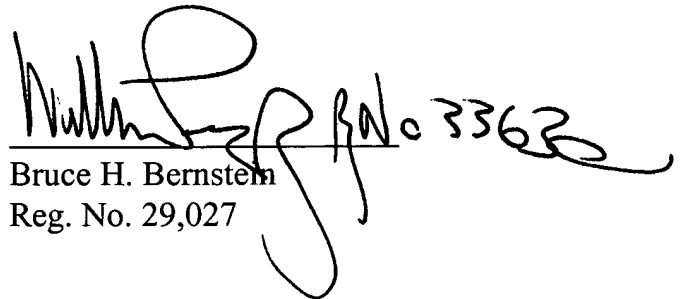
The amendments to the claims that have been made in this amendment, which do not narrow the scope of the claims, and which have not been specifically noted to

P21408.A03

overcome a rejection based upon the prior art, should be considered cosmetic in nature, and to have been made for a purpose unrelated to patentability, and no estoppel should be deemed to attach thereto.

Should there be any questions or comments, the Examiner is invited to contact the undersigned at the below-listed telephone number.

Respectfully submitted,
Takashi IIZUKA



Bruce H. Bernstein
Reg. No. 29,027

June 20, 2003
GREENBLUM & BERNSTEIN, P.L.C.
1950 Roland Clarke Place
Reston, Virginia 20191
(703) 716-1191

MARKED UP COPY OF AMENDED SPECIFICATION

[0037] Therefore, in the area of the lens other than the area Rc, the lateral chromatic aberration is generated. Accordingly, the two laser beams which have different wavelengths and are emitted by the laser diodes 10a and 10b, respectively, are separated as indicated by solid and broken lines when they [area] are incident on the light receiving element 31. Therefore, the light receiving element 31 outputs two synchronizing pulses at every scan. It should be noted that the optical paths indicated by two-dotted lines represent an imaginary optical path when the separation mirror 30 is not provided.

MARKED UP COPY OF AMENDED CLAIMS

1. (Once Amended) A scanning optical system [used] for exposing a predetermined imaging area on a surface to be scanned to a plurality of laser beams, comprising:

a plurality of light sources that emit a plurality of laser beams having different wavelengths, respectively;

a single deflector which deflects the plurality of laser beams simultaneously;

an imaging optical system that converges the plurality of laser beams deflected by said single deflector on the surface to be scanned; and

a beam detector that receives the plurality of laser beams directed to outside of the predetermined imaging area via at least one [of] lens element [elements] included in said imaging optical system, a synchronizing signal being generated upon detection of each of the plurality of light beams by said beam detector,

an optical characteristic of said imaging optical system being configured such that the laser beams directed to said predetermined imaging area are aligned in a scanning direction, while the laser beams directed to said beam detector are shifted in the scanning direction.

2. (Once Amended) The scanning optical system according to claim 1, wherein said single deflector comprises a polygonal mirror having a plurality of reflecting surfaces, one of said plurality of reflecting surfaces reflecting the plurality of laser beams [at] during each scan, said polygonal mirror being rotated so that the laser beams reflected by said reflecting surface scan.

5. (Once Amended) The scanning optical system according to claim 4, wherein said diffractive lens structure is formed in an predetermined area on a surface of said refractive lens element, the laser beams directed to said imaging area passing through said predetermined area, the laser beams directed to said beam detector passing through an area outside of said predetermined area [of said refractive lens].

6. (Once Amended) The scanning optical system according to claim 5, wherein said diffractive lens structure compensates for a lateral chromatic aberration of said at least one refractive lens element.

7. (Once Amended) A scanning optical system [used] for exposing a predetermined imaging area on a surface to be scanned, comprising:

a plurality of light sources that emit a plurality of laser beams having different

wavelengths, respectively;

a single deflector which deflects the plurality of laser beams simultaneously;

an imaging optical system that converges the plurality of laser beams deflected by said single deflector on the surface to be scanned; and

a beam detector that receives the plurality of laser beams directed to outside of the predetermined imaging area via at least one optical element included in said imaging optical system,

said imaging optical system [has] having a first range and a second range along a scanning direction, the laser beams directed to said imaging area passing through said first range, the laser beams directed to said beam detector passing through [a] said second range, said imaging optical system being configured such that, within said first range, a lateral chromatic aberration of said imaging optical system [being] is compensated for, and such that within said second range, a lateral chromatic aberration [resides] remains so that the plurality of laser beams are separated from each other in the scanning direction [thereof].

8. (Once Amended) The scanning optical system according to claim 7, wherein an optical characteristic of said imaging optical system, within said first range, is configured such that a plurality of beam spots respectively formed by the plurality of laser beams

P21408.A03

within said imaging area are aligned in the scanning direction, while the plurality of laser beams passing through said second range are incident on said beam detector at different timings.